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**HOW CANNIBALISTIC IS THE INTERNET  
CHANNEL?**

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## HOW CANNIBALISTIC IS THE INTERNET CHANNEL?

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# HOW CANNIBALISTIC IS THE INTERNET CHANNEL?

## ABSTRACT

During the past decade, irrational exuberance has turned into a possibly equally irrational pessimism about what the Internet can accomplish. The fear of getting ruined through cannibalization losses has recently deterred many firms from deploying the Internet as a distribution channel. But do Internet channels really cannibalize firms' entrenched channels, or is this widely held assumption exaggerated? To answer this question, we apply recent structural-break time-series econometrics to quantify the impact of an Internet channel addition on the long-run performance evolution of a firm's established channels. Using a database of 85 Internet channel additions over the last ten years in the British and Dutch newspaper industries, we find that the often-cited cannibalization fears have been largely overstated. The Internet therefore need not be disruptive to established companies and channels. This does, however, not imply that firms enjoy free play in setting up Internet channels. In cases where the newly established Internet channel too closely mimics the entrenched channels, substantial cannibalization is more likely to take place.

Keywords: Internet channel, Cannibalization, Structural-break time-series analysis

## 1. INTRODUCTION

For decades, the increasingly diverse needs of an ever more fragmented market have compelled firms to increase their product variety. Recently, firms are also turning to a second strategy to better address these diverse consumer needs: they increase their channel variety. Both strategies are risky, however, in that a new product or channel may cannibalize the sales of existing products and channels. While many marketers consider cannibalization when assessing the (potential) success of new product introductions (e.g., Mason and Milne, 1994; Reddy et al., 1994), there is hardly any knowledge about channel cannibalization. This may explain why Frazier (1999, p. 232) recently observed that “the ultimate effect [of increasing channel variety] on ... product sales is ... unclear”. This lack of research on channel cannibalization is surprising, especially since the issue has become so pertinent through the recent frenzy surrounding Internet channel additions. Specifically, absent scientific research, and after the first Internet euphoria settled down, practitioners now “widely *assume* that the Internet is cannibalistic [and] will replace all conventional ways of doing business” (Porter, 2001, p. 73, italics added).

This fear that the Internet is cannibalistic has rapidly pervaded the trade press, and is shared by both resellers and manufacturers. Resellers take the stance that the manufacturer who disintermediates by going online is stealing sales that are rightfully theirs. They regard the Internet as a disruptive force that will cannibalize their business, even to the extent that they are made obsolete. In turn, resellers’ cannibalization fears have alarmed manufacturers, many of whom now view Internet channels as a significant source of channel conflict that may cause resellers to provide lower support for the manufacturer’s products, or even to discontinue their distribution (Frazier, 1999). In a recent large-scale survey of Belgian firms, Konings and Roodhooft (2000) find that of all firms that have access to the Internet, only 15% use that site as an additional channel to actually sell products online. In the U.S., recent estimates indicate that over 40% of all businesses do not yet sell online ([www.nua.com/surveys](http://www.nua.com/surveys)), a number that increases to over 70% when excluding the largest businesses (Washington Post, 2001). The fear of upsetting their entrenched channels through cannibalization has deterred many of these firms from deploying the Internet as a distribution channel (Gilbert and Bacheldor, 2000). Other manufacturers have taken their fear one step further. Levi Strauss, for example, already withdrew its Internet channel after one year, mainly because of backlash from resellers and out of fear of getting ruined through cannibalization losses (Dugan, 1999).

In sum, many assume that the Internet is cannibalistic and will eventually replace conventional ways of doing business. Is this widely held assumption correct or exaggerated? Moreover, if cannibalization exists, is the downturn in performance of a permanent nature? These questions, in essence, are the focus of the current study. To answer these questions, we propose recent structural-break time-series econometrics to quantify the impact of an Internet channel addition on the long-run performance evolution of the firm's established channels. Our subsequent empirical application is situated in the newspaper industry. Based on a careful investigation of the cannibalization effects for 85 Internet channel additions over the last ten years in the British and Dutch newspaper industries, we attempt to provide empirical generalizations as to the magnitude and nature (permanent vs. temporary) of online cannibalization effects. The newspaper industry offers an interesting setting to test the validity of the cannibalization assumption because publishers have taken the lead in exploiting the Internet as a new distribution channel. As such, the publishing industry tends to "act as the pacesetter for the information society" (European Commission, 1996, p. 1), and may foreshadow trends that will occur more slowly in other industries.

## 2. LITERATURE REVIEW

Although there is surprisingly limited empirical work on channel cannibalization, several researchers have expressed their concern about the cannibalization hazards companies face when they add an Internet channel to their entrenched channels (e.g., Alba et al., 1997; Brynjolfsson and Smith, 2000; Coughlan et al., 2001). Both the academic and the trade press typically proclaim cannibalization effects to be present, as is reflected in the following quotes:

*"Established businesses that over decades have carefully built brands and physical distribution relationships risk damaging all they have created when they pursue commerce in cyberspace."* (Ghosh, Harvard Business Review, 1998, p. 126)

*"Call it survival by suicide. ... Today's corporate leaders are building separate new e-enterprises designed to compete head-on with the mother company."* (Useem, Fortune, 1999, p. 121)

The fear for online channel cannibalization is nourished by four observations (Geyskens et al., 2002). First, sales may shift from the entrenched channels to the new Internet channel when the latter provides more appealing features to the target audience, such as a quasi-unlimited amount of information on product attributes, increased customization, time savings, etc. (Alba et al., 1997). Second, the Internet is likely to increase the power of the consumer, as price comparisons across firms can be performed quickly and easily. The resulting increase in

price competition may explain why online prices for homogenous products are often found to be lower than those in conventional outlets (Brynjolfsson and Smith, 2000), which may cause sales to shift even further. Third, total sales may also decrease when consumers buy less through the new channel than through their old channel, e.g. when there are less impulse purchases through the Internet (Machlis, 1998). Fourth, existing channels may view the new Internet channel as unwelcome competition. When this happens, the firm's entrenched channels may lose motivation, and can reduce their support for the firm's products or even discontinue their distribution. This may, in turn, result in more brand switching towards the firm's competitors, and hence decreased total sales (Coughlan et al., 2001).

Unfortunately, in spite of the above theoretical observations, and at a time when there is much debate about Internet channel additions in the popular press, empirical evidence on the performance effects of Internet channel additions is still lacking, with the exception of Geyskens et al. (2002) and Ward and Morganosky (2000). However, the former application, which is also situated in the pace-setting newspaper industry, focuses on the total value implications of Internet channel additions (as measured by stock market returns), while the separate revenue impact of cannibalization is not explicitly considered nor quantified. In the multiple-industry study by Ward and Morganosky (2000), cannibalization is proxied by relating consumers' self-reported channel usage to information search in particular product categories. Specifically, consumers were asked to check whether or not they (a) bought and (b) searched for information on the product within the past six months from online outlets, catalogs, and/or retail stores. Since online product information search generated offline sales but not vice versa, the authors conclude that online channels do not cannibalize offline sales. Unfortunately, their cannibalization measure is very crude and makes abstraction of the *magnitude* of the cannibalization effect. Moreover, the above two studies approach cannibalization solely as a short-run phenomenon, a characteristic they share with the empirical *product* cannibalization literature. This short-term focus of existing studies is likely to contribute to managerial myopia (Dekimpe and Hanssens, 1999). Clearly, if shortsightedness is to be avoided, empirical studies that derive the long-run impact of (Internet) channel additions are essential. Or, as Frazier pointedly put it: "models need to be developed to help determine when multiple channels need to be relied on [since] the *ultimate* effect on *long-term* product sales is [...] unclear" (1999, p. 232, italics added).

To this extent, we examine whether the long-run evolution of the incumbent channels' revenues is affected. Specifically, recent advances in time-series econometrics will be used to determine whether the Internet channel addition caused *either* a persistent growth slowdown

or, in the absence of any growth impact, a sustained level drop in the company's traditional revenue streams.

### 3. METHODOLOGY

Over the last few years, time-series concepts such as unit-root and cointegration tests, error-correction models, and impulse-response and persistence estimates have become popular in the marketing literature to quantify the long-run impact of price promotions (Nijs et al., 2001; Srinivasan et al., 2000), advertising increases (Dekimpe and Hanssens, 1995), and distribution changes (Bronnenberg et al., 2000). All of these studies, however, look at the over-time performance implications of *regular, small* shocks, such as unexpected one-cent price reductions, one-unit/one-period increases in advertising spending, or gradual increases in distribution coverage, *which are all assumed to not change the underlying data-generating process* (Pesaran and Samiei, 1991).

The marketing event we consider, i.e. the addition of an Internet channel, is not quantifiable in a similar, continuous way. Yet, its impact on performance may well be substantial (Hanssens et al., 2001, p. 293), and can even change the underlying data-generating process. Dekimpe and Hanssens (2000, p. 191), for example, point out that “the constant parameter assumption in many persistence-based models may no longer be appropriate to test the long-run implications of Internet-related decisions”. We therefore extend the aforementioned studies to explicitly account for the fact that the event of interest may represent a different kind of shock to the system, in that it is (a) large, (b) infrequent, and (c) may structurally alter the long-run properties of the time-series (Balke and Fomby, 1991), causing a different steady-state growth (or decline) path to emerge (Ben-David and Papell, 1995, 1998).

Specifically, we start our testing procedure with the structural-break unit-root test, as described in Perron (1989, 1994):

$$Y_t = \alpha + \beta T + [\theta DU_t + \gamma DT_t + \delta D(TB)_t] + \rho Y_{t-1} + \sum_{i=1}^k c_i \Delta Y_{t-i} + \sum_{s=2}^S \eta_s SD_{st} + \varepsilon_t \quad (1)$$

with  $Y_t$  the log-transform of the performance measure of interest,<sup>1</sup>  $T$  a deterministic trend variable,  $SD_{st}$  a set of seasonal dummy variables,  $\varepsilon_t$  a series of white-noise residuals, and  $DU_t$ ,

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<sup>1</sup> This transformation is common practice in time-series analyses, as it allows reducing potential heteroskedasticity in the data. Moreover, the first difference of the log-transformed series provides a good measure for the growth rate of the original series (Franses and Koop, 1998).

$DT_t$  and  $D(TB)_t$ , three structural-break dummy variables, discussed in more detail below. Making abstraction of the terms between square brackets, Eq. (1) becomes the well-known Augmented Dickey-Fuller (ADF) test.<sup>2</sup> The lagged first differences are added to ensure that the residual series is indeed white noise, while the parameter  $\rho$  is the key parameter of interest to separate (level or trend) stationary ( $\rho < 1$ ) from evolving, unit-root ( $\rho = 1$ ) series.<sup>3</sup>

We extend the standard ADF test with three dummy variables to allow the exogenous event of interest, i.e. the Internet channel addition, to cause a structural change in the growth rate and/or level of the conventional channel's performance. As is common in the structural-break literature (see e.g. Ben-David and Papell, 1995, 1998), we allow for a structural change in the trend function of the data-generating process, and do not account for changes in e.g. the model's autoregressive parameters or error variance. This approach is completely in line with the intervention-analysis approach of Box and Tiao (1975),<sup>4</sup> in that extraordinary events are separated from the regular noise function, and modeled as a change (intervention) in the deterministic part of the time-series model (Perron, 1994). Denoting  $TB$  as the potential break date, the dummy variable  $DT_t$  takes the value of  $t - TB + 1$  when  $t \geq TB$ , and zero otherwise. As such, it allows for a change in the growth rate of the trend curve at the time of the channel addition.  $DU_t$ , which is a step dummy variable that takes on the value of one when  $t \geq TB$  and zero otherwise, is used to allow for a level shift at the time of the introduction, while  $D(TB)_t$  is a pulse dummy taking the value of one when  $t = TB$  and zero otherwise. This third dummy variable is only added to ensure that the test statistic on  $\rho$  remains invariant in finite samples to the value of the change in the intercept under the null hypothesis of a unit root (Perron, 1994), but has no substantial interpretation in our context.

When  $\rho < 1$ , the unit-root null-hypothesis is rejected and hypotheses tests concerning the other parameters can be carried out using conventional  $t$  and/or  $F$  tests (Holden and Perman, 1994; Perron, 1994). When  $\gamma$  is significant and negative, the introduction of the new Internet channel has a cannibalizing effect in that it initiates a decline (when  $\beta$  was equal to zero) in the performance evolution of the conventional channel, slows down its growth (in case  $\beta > 0$ ), or accelerates an already ongoing decline (for  $\beta < 0$ ). The most dramatic change

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<sup>2</sup> See Enders (1995) for a general discussion, and Nijs et al. (2001) for a recent marketing application.

<sup>3</sup> Following Perron (1989, 1994), a general to specific recursive procedure is used for selecting the truncation lag parameter  $k$ . Starting with  $k$  equal to 8, it is successively reduced until a model is found where the last lag is significant, while the one-higher lag is no longer significant. If no lags are significant,  $k$  is set to zero. Following common practice (Perron, 1989; Zivot and Andrews, 1992), the criterion for testing the significance on the last lag is set to 1.60.

<sup>4</sup> See e.g. Leone (1987) for a marketing application.



occurs if  $|\gamma| > |\beta|$  with  $\beta > 0$  and  $\gamma < 0$ , in which case the sign of the growth path would be reversed after the Internet channel addition, a situation referred to as a growth meltdown (rather than a mere slowdown) by Ben-David and Papell (1998).

The coefficient  $\gamma$ , however, measures only the *immediate* impact on the series' growth rate. To quantify the full, *long-run* growth impact, we rewrite Eq. (1) as:

$$Y_t = \alpha + \beta T + \theta DU_t + \gamma DT_t + \delta D(TB)_t + \sum_{i=1}^{k+1} a_i Y_{t-i} + \sum_{s=2}^S \eta_s SD_{st} + \varepsilon_t \quad (2)$$

and compute the difference between the long-run growth ( $\Delta Y_{LR}$ ) of this autoregressive series before and after the Internet-channel addition:

$$\Delta_{LR, \text{ after } Y} - \Delta_{LR, \text{ before } Y} = \frac{\beta + \gamma}{1 - \sum a_i} - \frac{\beta}{1 - \sum a_i} \quad (3)$$

The long run, or *steady-state*, growth rate of a series is time-subscript independent, and is obtained as  $\lim_{t \rightarrow \infty} \Delta Y_t$ . Assume, for ease of exposition, the following first-order autoregressive process with normal starting conditions  $Y_0 = 0$  and with the error term omitted:

$$Y_t = \alpha + \beta T + a_1 Y_{t-1} \quad (4)$$

In this stylised example, it is easy to show that  $\Delta Y_1, \Delta Y_2, \Delta Y_3, \dots$  equal  $[\alpha + \beta]$ ,  $[a_1 \alpha + (1 + a_1) \beta]$ ,  $[a_1^2 \alpha + (1 + a_1 + a_1^2) \beta]$ ,  $\dots$ . Looking in steady state, i.e. letting  $t \rightarrow \infty$ , a long-run growth rate of  $\beta / (1 - a_1)$  is obtained. When working with higher-order autoregressive models, this expression for long-run steady-state growth generalizes to  $\beta / (1 - \sum a_i)$  (see Ben-David and Papell, 1995 for a formal treatment). Similarly, once the trend break dummy  $DT_t$  in Eq. (2) becomes effective, the 'new' steady-state growth rate becomes  $(\beta + \gamma) / (1 - \sum a_i)$ . Standard errors on (the difference in) these steady-state growth rates can subsequently be derived using the well-known delta-method.

When  $\gamma / (1 - \sum a_i)$  is not significant, the traditional channel does not experience a long-run growth slowdown because of the Internet channel addition, but its level may be reduced permanently. To assess whether, in the absence of a growth change, cannibalization effects show up in the form of a level drop, we re-analyze Eqs. (1) and (2) without  $DT_t$ , and test for the significance of  $\theta$ . Depending on the value of the autoregressive parameters  $a_i$  ( $i = 1, \dots, k + 1$ ) in Eq. (2), part of this initial loss may either become persistent, or the initial loss may even be intensified in subsequent periods. Using a similar logic as before, this long-run effect can be shown to equal  $\theta / (1 - \sum a_i)$ .

When  $\rho = 1$ , the unit-root null hypothesis is not rejected, causing  $t_\theta$  and  $t_\gamma$  to no longer be asymptotically normally distributed (Holden and Perman, 1994; Perron, 1994). We therefore follow Ben-David and Papell (1998) and Franses (1998), in that we first impose the unit root found through Eq. (1), and estimate the following equation in first differences:

$$\Delta Y_t = \alpha + [\gamma DU_t + \theta D(TB)_t] + \sum_{i=1}^k a_i \Delta Y_{t-i} + \sum_{s=2}^S \eta_s SD_{st} + \varepsilon_t \quad (5)$$

The  $\gamma$  parameter associated with the step dummy  $DU_t$  then gives the immediate impact on the growth rate, while the  $\theta$  parameter associated with the pulse dummy  $D(TB)_t$  quantifies immediate level shifts (see also Balke and Fomby, 1991). The corresponding long-run effect on the steady-state growth rate can then be shown to equal  $\gamma/(1-\sum a_i)$  (Ben-David and Papell, 1998). In the absence of any growth impact, we again impose a common slope for the trend function before and after the Internet channel introduction, i.e. we re-analyze Eq. (1) and Eq. (5) without  $DU_t$ , and test for the significance of  $\theta/(1-\sum a_i)$ . This parameter allows testing whether cannibalization effects show up in the form of a persistent level drop.

In sum, long-run cannibalization effects will be quantified through the decline traditional channels experience in their steady-state *growth rate*, or, in the absence of any growth impact, through the size of the persistent reduction in their performance *level*.

#### 4. DATA DESCRIPTION

Our empirical application is situated in the newspaper industry. This industry offers an interesting setting to test the validity of the cannibalization assumption for two reasons. First, cannibalization is particularly imminent when *information* products are delivered online (Shapiro and Varian, 1999). Speed of delivery, easy search facilities, and customization options tend to increase the value of the information product in the online channel over existing offerings through traditional channels. Second, whereas the newspaper industry shares the above characteristic with other information goods industries, it has the additional cannibalization-prone characteristic that most publishers are still reluctant to charge for their online editions. As such, any switching between conventional and on-line channels should negatively affect circulation revenue. Moreover, the newspaper industry represents an old and mature industry, where competition is mostly a zero-sum game (Abbring and Van Ours, 1994). Cannibalization fears when going online are therefore even more realistic (see e.g. U.S. Department of Commerce, 1998).

Cannibalization losses may be reflected in a net reduction in either one of the newspaper's existing income streams: circulation revenue obtained from the number of copies sold and advertising income (Abbring and Van Ours, 1994). With respect to circulation, Mitchell (2001) reports that 50% of all publishers fear that their Internet operations may inflict long-run harm on their print business. Gilbert (2001), on the other hand, argues that, if positioned correctly, print and online versions may actually operate in a complementary way, in that the latter may attract new readers not currently subscribing to the print edition. A similar uncertainty exists on the extent of cannibalization that will arise in the advertising arena. First, newspapers' advertising incomes are positively correlated with the size of their subscription base, for which the impact is (as argued before) still unclear. Second, Silk et al. (1999) argue that newspapers are a potentially vulnerable medium to loose their advertisers to the Internet, even though the extent of this loss will again depend on the relative positioning of both media.

Data were collected for 85 online newspaper introductions in two European countries, the U.K. and the Netherlands. Information on the online introduction dates were gathered by contacting each individual newspaper, and extensively validated through both newspaper archive searches and the Dow Jones Interactive Publication Library. The earliest launch dates were November 1994 and July 1995, whereas the latest launches took place in October 1999 and April 2000 for the U.K. and the Netherlands, respectively.

*Circulation* data were collected for 67 daily U.K. newspapers that went online within the available data period. Circulation is expressed as the average number of copies sold daily. The data are obtained from the 'Audit Bureau of Circulations' (ABC). We have 138 monthly observations for 12 national and 55 regional publications (January 1990 until June 2001). On average, 42 (minimum = 20; maximum = 79) observations are available after the introduction date of the online version.

*Advertising* revenues from the traditional paper edition were obtained from 18 Dutch newspapers that introduced an online version of their paper within the considered time period. The data are expressed in constant guilders and were provided by the 'Bureau voor Budgetten Controle' (BBC). For both national (nine) and regional newspapers (nine), we have 130 monthly observations (January 1990 until October 2000). On average 41 (minimum = 6; maximum = 63) observations were available after the introduction date of the online version.

## 5. EMPIRICAL RESULTS

Cannibalization losses may be reflected in a net reduction in one (or both) of the newspapers' two existing income streams: circulation and advertising income. We first discuss findings on the circulation data (Section 5.1), followed by the results for advertising (Section 5.2). Section 5.3 provides several robustness checks on our main findings.

### 5.1. Circulation results

The unit-root null hypothesis is rejected in 14 instances based on the regular ADF test (using the conventional 5% significance level), and in five additional cases when allowing for a structural break at the time of the Internet channel addition. This confirms prior simulation evidence in Perron (1989) that a failure to account for a major exogenous event tends to bias regular unit-tests towards non-rejection of the null hypothesis.

Long-run, steady-state, growth rates are summarized in column 2 of Table 1, and were derived based on the parameter estimates in Eq. (2) for the 19 level/trend stationary series, while Eq. (5) was used for the 48 unit-root series. Given our interest in the presence of cannibalization, directional (one-sided) tests are used.<sup>5</sup>

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Insert Table 1 about here  
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Steady-state growth rates showed a significant decline after the Internet channel introduction in only five series (i.e. a mere 7% of cases).<sup>6</sup> The average long-run growth impact across all 67 newspapers indicates a small but positive effect, obtained from about an equal number of negative (35) and positive (32) changes that are also approximately equal in absolute value (-.0014 and .0018).<sup>7</sup>

While only five newspapers experience a *significant* long-run growth slowdown, one could argue that across *all* 67 observations, the number of negative long-run growth-rate

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<sup>5</sup> Note that we also need one-sided *p*-values as input for our subsequent meta-analysis (Rosenthal, 1991).

<sup>6</sup> Even though our main interest lies in cannibalization, it is worth noting that in ten instances a positive steady-state growth-rate change was observed ( $t > 1.64$ ). Interestingly, the newspaper with the largest positive significant break is the Financial Times, the only English newspaper focusing almost exclusively on economic issues. This finding is in line with Pauwels and Dans (2000), who argue that economically-oriented newspapers are likely to experience positive spill-over effects from an on-line channel addition.

<sup>7</sup> Interestingly, most of the circulation series showed a negative evolution, both before and after the Internet channel addition, supporting common wisdom that the newspaper industry is an industry in decline (Abbring and Van Ours, 1994). A significant negative trend break in such series indicates that the introduction of a new Internet channel accelerates an already ongoing decline (rather than slowing down its growth).

changes in our sample is substantial (35). We therefore conducted a meta-analysis to test for the presence of cannibalization using the one-sided  $p$ -values associated with the change in the long-run growth rate after the Internet channel introduction, using the method of adding weighted  $Z$ 's (Rosenthal, 1991). This offers a stronger test for the presence of cannibalization than the significance of the individual impact estimates. Indeed, when the impact on many newspapers is weak (e.g.  $p < .20$ ) but in the same direction, case-by-case tests would not reveal any significant cannibalization impact to worry about. Still, the *collective* evidence, as reflected in the meta-analysis, would suggest a highly significant effect (see Rosenthal, 1991 for technical details, or Dekimpe et al., 1997 for a marketing application). However, also the collective evidence showed no support for the presence of a significant cannibalization threat in the newspapers' circulation-revenue growth ( $p = .94$ ).

Cannibalization may not only result in a *growth* slowdown, however. It may also show up in a *level* drop. The 52 series where the  $t$ -statistic on  $\gamma$  was smaller than 1.64 in Eq. (2), were therefore re-analyzed after imposing a common pre and post growth-rate (i.e. we deleted  $DT_t$  from Eq. 2 and  $DU_t$  from Eq. 5), and we tested for the significance of  $\theta/(1-\sum a_i)$  (column 3, Table 1). Four significant negative level shifts were found. When focusing on the average level impact across all 52 series, a pattern quite similar to that of the growth rate change can be observed. Again, a very small average positive effect is found, based on an equal number of negative (26) and positive (26) values that are also almost equal in absolute size (-.0128 and .0130). Moreover, the Rosenthal test did, once more, not reveal a significant level drop ( $p = .58$ ).

## 5.2. Advertising results

As with the circulation data, most advertising series are classified as having a unit root: based on the structural-break (regular) test, the unit-root null hypothesis was rejected in 4 (3) instances. Long-run, steady-state, growth rates are summarized in column 4 of Table 1. Of the 18 cases examined, only one experienced a significant reduction in steady-state growth rate ( $\gamma/(1-\sum a_i) = -.0051$ ;  $t = -2.27$ ).<sup>8</sup> Even though only one newspaper experiences a significant long-run growth slowdown, the number of negative long-run growth-rate changes is substantial (11). Moreover, the average growth impact across *all* 18 observations is negative

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<sup>8</sup> For one newspaper, a marginally significant growth *increase* is observed ( $\gamma/(1-\sum a_i) = .0066$ ;  $t = 1.67$ ). Again, this is the most economically oriented newspaper of our sample, offering further support to the aforementioned conjecture of Pauwels and Dans (2001).

(-.0030). However, as with the circulation data, also the collective evidence from the Rosenthal test did not reveal a significant cannibalization effect ( $p = .13$ ).

The 16 newspapers with a  $t$ -statistic for  $\gamma$  less than 1.64 in Eq. (2), i.e. whose long-run growth was not affected by the Internet channel addition, were subsequently re-analyzed after imposing a common slope. None of the newspapers experienced a significant reduction in their steady-state performance level because of the Internet channel addition (column 5, Table 1). Also the meta-analysis did not reveal such an effect ( $p = .98$ ).

### **5.3. Robustness checks**

Based on this individual and collective evidence, we can conclude that the fear for cannibalization in terms of the newspapers' circulation and advertising income appears to be overrated. To assess the robustness of this substantive conclusion, we conducted a number of validation checks. Specifically, we (1) assessed the sensitivity of our results to the level of temporal aggregation in the data, (2) tested whether the finding of no cannibalization was driven by the lack of sufficient post-event data, and (3) correlated the growth and/or level changes with the stock-market reactions reported in Geyskens et al. (2002).

#### **5.3.1. Sensitivity to the level of temporal aggregation**

Prior research has demonstrated that both unit-root tests (Pierse and Snell, 1995) and inferences about the autoregressive parameters (Rossana and Seater, 1995) may be sensitive to the level of temporal aggregation in the data. Following Nijs et al. (2001), we doubled our temporal aggregation level from a monthly to a bi-monthly level.

Our substantive results were not affected. In terms of the circulation data, the same outcome was obtained for the structural-break unit-root tests in more than 80% of the cases. Seven newspapers were found to have a significant negative growth-rate change in the bimonthly series (as opposed to five when working with monthly data), and the collective evidence was again very similar: the average change in steady-state growth is approximately twice as large as for the monthly analysis (-.0029 versus -.0014 for the negative changes, and .0036 versus .0018 for the positive changes), while the Rosenthal test, in accordance with the monthly analyses, showed no significant impact, neither for the trend breaks ( $p = .99$ ) nor for the level shifts ( $p = .89$ ).

For the advertising data, none of the unit-root test outcomes was affected. In terms of their long-run growth rate, a significant growth slowdown was found for the same newspaper, with the change in its steady-state growth rate (-.0089) about twice the change in its monthly

growth rate (-.0051). As before, the average change in growth rate across all 18 observations is approximately twice as large as for the monthly analysis (-.0111 versus -.0065 for the negative changes, and .0085 versus .0030 for the positive changes), and the meta-analytic Rosenthal test continued to show no significant impact ( $p = .24$ ). As for the level shifts in advertising income, we again found none of the individual level shifts to be significantly negative, and the meta-analytic test result was again not significant ( $p = .97$ ).

### 5.3.2. *Sensitivity to the timing of the Internet channel introduction*

One could argue that for the more recent Internet channel additions, insufficient post-event data points were available to detect cannibalization. As indicated before, on average, 42 post-event circulation observations (minimum = 20; maximum = 79) were available, and 41 post-event advertising observations (minimum = 6; maximum = 63). If the argument above would be valid, however, we would expect more evidence of cannibalization in those series that experienced the Internet channel addition earlier. Two test procedures for this contention were implemented, a regression of the long-run growth-rate/level changes against the introduction time of the Internet edition, and a split-half analysis.<sup>9</sup>

For the circulation series, we first ran a regression of, respectively, the change in long-run, steady-state, *growth* rate (using all 67 observations) and of the change in long-run *level* (based on the 52 observations mentioned earlier) on the time of the Internet channel introduction. No significant relationship was found ( $\beta = -2.53 \cdot 10^{-6}$ ,  $p = .89$  and  $\beta = -1.96 \cdot 10^{-4}$ ,  $p = .36$ ). Second, the Rosenthal test was conducted on two subsamples, constructed according to a median split on the entry-timing variable. Again, in none of the analyses, any collective evidence of cannibalization was found, neither in terms of a growth slowdown ( $p = .99$  for early entrants, and  $p = .49$  for late entrants) nor in terms of a level reduction ( $p = .72$  for early entrants, and  $p = .63$  for late entrants).

In terms of the newspapers' advertising figures, the same two test procedures were applied. The regression against the time of entry did not find any positive relationship between the timing of the Internet channel introduction and the change in either long-run growth (based on 18 observations) or long-run level (based on 16 observations). Rather, the slope coefficient for the long-run growth rate turned out to be negative rather than positive ( $\beta$

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<sup>9</sup> No heteroscedasticity was found using the White test. We therefore applied OLS instead of WLS (see Nijs et al., 2001 for a similar approach).

$= -2.62 \cdot 10^{-4}$ ,  $p = .014$ ) and the long run level shifts showed again no relation ( $\beta = 7.39 \cdot 10^{-5}$ ,  $p = .95$ ). Similarly, the Rosenthal test on the subsamples of early, respectively, late entrants was never significant, neither in terms of their steady-state growth rate ( $p = .18$  for early entrants, and  $p = .26$  for late entrants), nor in terms of their long-run level ( $p = .69$  for early entrants, and  $p = .99$  for late entrants).

### 5.3. Linkage with the stock-market reaction to the Internet channel introduction?

Geyskens et al. (2002) argue that Internet channel additions may have value-enhancing (e.g. demand expansion, higher prices, and lower physical-distribution and/or transaction costs), as well as value-destroying (e.g. *cannibalization*, lower prices, and higher costs) effects. They test their framework in the same industry through a financial event study. Arguing that financial markets are efficient and therefore should reflect all relevant information about these various factors, they report (a) a positive average stock-market reaction around the event date, as reflected in a cumulative average abnormal return (CAAR) around the event day of .71%,<sup>10</sup> and (b) a mixture of both positive and negative CAARs when looking at the individual newspapers.

Across the two countries considered in our study, 44 newspapers also appeared in the Geyskens et al. (2002) sample. Based on those 44 observations, a significant positive correlation is found between these newspapers' CAARs and their change in steady-state growth rate (Pearson correlation coefficient = .33,  $p = .029$ ). Of the newspapers that received a positive (negative) stock-market reaction, 64 % (63%) were characterized by a positive (negative) change in their steady-state growth. This result is encouraging, especially when considering that the cannibalization threat is just one of the many value enhancing/destroying factors identified in the conceptual framework of Geyskens et al. (2002), all of which are supposedly reflected in the ultimate stock-market reaction. The relationship between the CAARs and the level shifts is weaker, resulting in an insignificant correlation ( $p = .41$ ).

## 6. DISCUSSION

During the past decade, irrational exuberance has turned into a possibly equally irrational pessimism about what the Internet can accomplish. The fear of getting ruined through cannibalization losses has recently deterred many firms from deploying the Internet as a

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<sup>10</sup> The event window considered was [0,1] days.



distribution channel. Caught up in this general fervor, others have already withdrawn their Internet channels only shortly after having established them. But do Internet channels really cannibalize firms' entrenched channels? Or is this widely held assumption exaggerated and are practitioners making fundamental mistakes by shying away from this new channel? Unfortunately, this issue of high managerial importance has barely been touched on in empirical research. The time has come to move away from jumping to the presumption that the Internet is automatically cannibalistic and see the Internet for what it is.

Using a database of 85 Internet channel additions over the last ten years in the British and Dutch newspaper industries, we find that the often-cited cannibalization fear has been largely overstated. Relatively few newspapers in our sample experience a significant drop in their circulation or advertising revenues. This result may imply that there is only little overlap between customers using the traditional channel and those preferring the online channel. Indeed, a number of researchers have recently argued that the readership profile of online newspapers tends to be younger, higher educated, mainly male and more technology oriented than the majority of the print readers (e.g., Nicholson 2001; Pauwels and Dans, 2000). Similarly, the overwhelming majority of online advertisers are not print advertisers. Key advertising customers in print are local department stores, grocery chains, and retail clients, whereas most Internet advertising is placed by sellers of computer-related products and services (Gilbert, 2001; Silk et al., 2001).

Still, this does not imply that firms have free play in setting up Internet channels. An appropriate positioning is still called for, as recently argued by, among others, Gilbert (2001) and Silk et al. (2001). Indeed, when the new channel is positioned as too close a copy (substitute) to its traditional counterpart, cannibalization will more likely take place. Support for this contention is found when comparing newspapers that experienced significant cannibalization losses in their circulation revenues (9) with those that did not (58) in terms of product similarity (overlap) between the online and print version of the product.<sup>11</sup> A *t*-test on the difference in mean similarity across both groups strongly indicates that newspapers' circulation revenues are more likely to get cannibalized when there is a high overlap between their online and offline versions (mean similarity is 78% for cannibalized newspapers versus 45% for non-cannibalized newspapers;  $p = .0008$ ).

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<sup>11</sup> Data on product similarity were obtained by contacting the newspapers' webmasters, and asking them to indicate the percentage overlap between the online and print version of the newspaper at the time the Internet edition was first launched. A similar operationalization was adopted in Gilbert (2001).

In sum, our conclusions are encouraging. The threat of cannibalization appears to be considerably lower than widely assumed. The Internet rarely cannibalizes traditional channels. The Internet therefore need not necessarily be disruptive to established companies and channels. Too often, change is confused with disruption. Disruption means invalidating or making substantially less important the advantages of incumbents (Bower and Christensen, 1995). The Internet does not invalidate the importance of entrenched distribution channels. Firms can have both together, and can even create some synergies from a diverse, yet well positioned, channel portfolio.

*Limitations and further research.* The present study has various limitations, which offer immediate avenues for future research. First, we treated the potential break date as exogenous, i.e. we made full use of prior (managerial) knowledge on the timing of the Internet channel introduction. Alternatively, one could let the data suggest endogenously the most likely break date (as advocated, for example, in Vogelsang 1997 or Zivot and Andrews 1992), and see whether the Internet channel introduction coincides with (or is located closely to) this break point. Second, there is the issue of external validity. We conjecture that in the absence of cannibalization effects in the cannibalization-prone newspaper industry, the widely claimed cannibalization threat would also appear to be overrated for other, less vulnerable, industries. Future research should explore to what extent this conjecture holds true and our results are generalizable to other industries. Third, the nonavailability of data on both revenue streams for the same set of newspapers prevented us from analyzing the interaction that is to be expected between circulation and advertising (Abbring and Van Ours, 1994). Finally, given that cannibalization effects are largely absent, future research could analyze how firms can achieve positive spillover effects from an Internet channel edition, as was obtained in our sample for the more economically-oriented newspapers.

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**TABLE 1: LONG RUN PERFORMANCE IMPLICATIONS OF AN INTERNET CHANNEL INTRODUCTION**

	<i>Circulation</i>		<i>Advertising</i>	
	<i>Impact on Steady State Growth</i>	<i>Impact on Steady State Level</i>	<i>Impact on Steady State Growth</i>	<i>Impact on Steady State Level</i>
Sample size (n)	67	52	18	16
# negative impact	35	26	11	7
# significant negative impact (5%)	5	4	1	0
# positive impact	32	26	7	9
Average negative impact	-.0014	-.0128	-.0065	-.0231
Average positive impact	.0018	.0130	.0030	.0671
Overall average	.0002	.0001	-.0030	.0276
Rosenthal test on cannibalization	$p = .94$	$p = .58$	$p = .13$	$p = .98$